

LANTERN MORPHOLOGY OF THE EOCENE ECHINOID
WEISBORDELLA CUBAE (WEISBORD)

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THE echinoid jaw apparatus or lantern is comprised of approximately 40 calcareous plates, of which only the pyramids and teeth are usually preserved in fossils. The pyramids and teeth are sufficiently calcified portions of the lantern, and as such should be more common than the literature suggests. Spreng and Howe (1963), in their study on Paleozoic regular echinoid lanterns, noted that the lantern is rarely preserved or often difficult to recognize since it is seldom complete. A thorough search of the literature dealing with Mesozoic echinoids suggests that lantern preservation is also poor. Illustrations in the literature on Tertiary echinoids indicate that lantern ossicles are preserved, but unfortunately they are not described. Several taxonomists (Jackson, 1912; Moore, Lalicker, and Fischer, 1952) have pointed out the importance of the lantern as being diagnostic at the ordinal and subordinal levels, yet there is a dearth of published data on this structure insofar as the fossil record is concerned.

Preliminary studies undertaken by the authors and based upon the Florida State Museum collections at the University of Florida indicate that several species in the Florida Tertiary fauna are frequently preserved with a number of lantern ossicles intact. The present study describes and illustrates, for the first time, portions of the masticatory structure of the late Eocene clypeastroid *Weisbordella cubae* (Weisbord).

In the present study the morphological terminology employed essentially follows that proposed by Loven (1892) and Jackson (1912).

The specimens here described were collected from a quarry in the Ocala limestone (Eocene) on the south side of Florida Highway 24, about 4.2 miles southwest of the junction of U. S. Highway 441 and Florida 24 at Gainesville, Alachua County, Florida.

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The lantern apparatus in living echinoids is a complex of calcareous plates and muscles which serve to crush and grind food

(Hyman, 1955). The procumbent pyramids of *W. cubae* form a comparatively flattened stellate pentagon, the diameter of which exceeds the height. Each pyramid is typically V-shaped with alae that project sharply outward and become narrowly acuminate distally. The posterior pyramid (5) is the largest, the anterior pair (2 and 3) smaller, and the posterio-lateral pair (1 and 4) smallest.

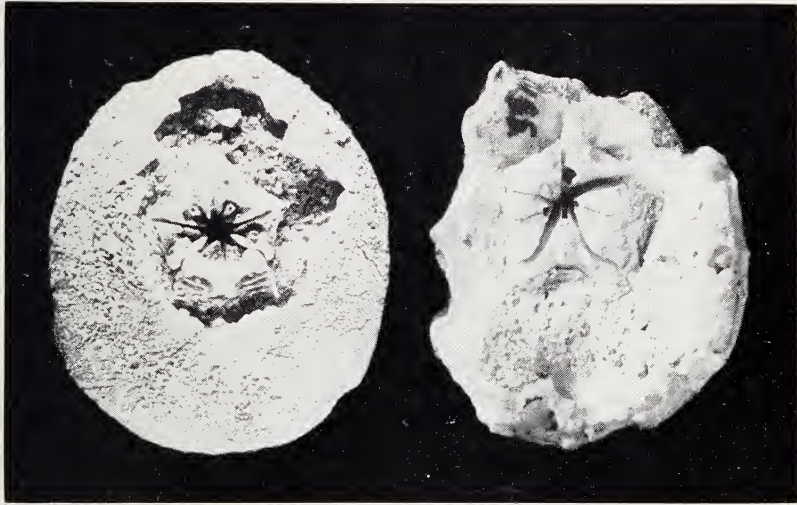


Fig. 1. Dorsal (left) and ventral (right) views of lantern apparatus of *Weisbordella cubae*. Specimens oriented with anterior end towards top of page. Hypotypes, Florida State Museum Nos. 910 (left) and 357 (right). Actual width of specimens 28.7 (left) and 28.2 (right) mm.

The ventro-lateral edges of the pyramids are sharply ridged. The ventral surface is irregularly undulating, with only moderate relief, and gradually slopes toward the median crest. Generally, there are one or two deep fossae, on the ventral surface of the pyramid, which fit over the auricles of the perignathic girdle, but in this species they are lacking. Orally a medial groove marks the symphysis of the two hemipyramids or alveoli, but aborally the alveoli are fused with the line of fusion still evident on the dorsal median crest. The initial point of alveolar fusion appears approximately midway between the dorsal and ventral surfaces. One pyramid was broken along the line of fusion in order to view the symphyseal face, which was here seen to be smooth. The lateral surfaces of the pyramid are slightly rugose for the attachment of the inter-

pyramidal muscles. On the lateral surface there appears to be no distinct triangular area separating the external and internal alar regions. The outer-aboral face of the pyramid is strongly septate, with the lateral edges of the septa conspicuously denticulate. At the proximal end of the transverse septa there is a moderately deep, ovate fossa, of which the transverse crest forms the aboral limit.

Situated aborally on each alveolus is a small transverse crest. The proximal portions of the transverse crest of each alveolar pair are fused to form a short medial crest, the whole appearing as a Y-shaped structure. An enlargement of the distal end of the transverse crest, the supra-alveolar process, supports the epiphysis. The epiphyses are simple, flat, thin, and roughly elliptical in outline. The interpyramidal faces of the epiphyses are strongly roughened through secondary calcification. The articulating surfaces of the epiphysis and supra-alveolar process are slightly rugose.

No recognizable trace of a rotula can be determined from the present specimens. The compass is lacking in clypeastroids (Hyman, 1955).

A medial sulcus or dental groove is formed at the junction of the proximal ends of the alveoli. The inner walls of the sulcus are strongly septate; the septa lack denticulae. Aborally, the sulcus flares, forming what is referred to as the foramen magnum. The foramina of pyramids 1, 2, 3, and 4 are deep and moderately broad, whereas the foramen of pyramid 5 is approximately one-third broader. Ventrally, an inward extension of the walls forms an open pentagonal slot to maintain alignment of the teeth.

The teeth are slightly arcuate and pentagonal in section. It is difficult to reconstruct the exact attitude of the teeth since they are fused with the pyramids, and the pyramids have shifted from a life position. Their present angle of repose indicates that the teeth were inclined from the vertical at an angle of about 15 to 20 degrees. The upper part of the tooth extends well into the foramen magnum. Extending the length of the inner face of the tooth is a slight concavity. Aborally, the tooth is hollow, and the uppermost surface is inclined downward towards the inner face. There is a U-shaped notch on the inner margin of the dorsal surface. The edges of the teeth are too poorly preserved to determine their true nature. However, the teeth appear to have terminated in a chisel edge rather than in a point.

LITERATURE CITED

- HYMAN, L. H. 1955. The invertebrates: Echinodermata. The coelomate Bilateria. McGraw-Hill, New York, 763 pp., 280 text-figs.
- JACKSON, R. T. 1912. Phylogeny of the Echini, with a revision of the Paleozoic species. Boston Soc. Nat. Hist. Mem. 7, pp. 1-491, text-figs. 1-256, pls. 1-76.
- LOVEN, S. 1892. Echinologica. Bihang K. Svenska Vet.—Akad. Handl., Bd. 18, afd. 4, no. 1, pp. 1-73, pls. 1-12.
- MOORE, R. C., C. G. LALICKER, AND A. G. FISCHER. 1952. Invertebrate fossils. McGraw-Hill, New York, 766 pp.
- SPRENG, A. C., AND W. B. HOWE. 1963. Echinoid jaws from the Mississippian and Pennsylvanian of Missouri. Jour. Paleont., vol. 37, no. 4, pp. 931-938, 6 text-figs.

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